CLAIM AMENDMENTS

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims

1. (Currently Amended) A router, comprising:

a partitionable data plane including a plurality of forwarding tables, each forwarding table including forwarding information that effectuates a data forwarding process through said router;

a partitionable control plane including a plurality of routing tables operating under control of at least one routing protocol process, said routing tables including information that effectuates routing decisions with respect to said data forwarding process;

a partitionable update agent plane coupled to both said partitionable data plane and said partitionable control plane, said partitionable update agent plane comprising:

a control plane update agent module ~~for maintaining~~ that maintains at least one ~~a~~ redundant set of routing table information in ~~at least one~~ a plurality of control plane update ~~buffer~~ buffers that are coupled to said plurality of routing tables.

wherein said control plane update buffers are located on said control plane, and

wherein said control plane update agent module synchronizes said routing tables; and

a data plane update agent module operably coupled to said control plane update agent module to coordinate said forwarding information with said routing table information in association with a plurality ~~set~~ of data plane update buffers that are coupled to said forwarding tables,

wherein said data plane update buffers are located on said data plane,

wherein said forwarding tables are maintained, updated, and redundantly engineered independently of failures on said routing tables.

2. (Currently Amended) The router as set forth in claim 1,

wherein said data forwarding process continues to proceed in an event of failure based on information stored in at least one of said data plane update buffers and said control plane update ~~buffer~~ buffers.

3. (Original) The router as set forth in claim 2,

wherein said event of failure comprises a failure associated with said partitionable data plane.

4. (Original) The router as set forth in claim 2,

wherein said event of failure comprises a failure associated with said partitionable control plane.

5. (Original) The router as set forth in claim 2,

wherein said partitionable data plane comprises a plurality of data plane nodes, each having at least one forwarding table and at least one data plane update buffer.

6. (Original) The router as set forth in claim 5,

wherein said plurality of data plane nodes are organized into a scalable cluster.

7. (Original) The router as set forth in claim 5,

wherein said data plane update agent module comprises a plurality of data plane update agents, each being associated with a data plane node.

8. (Original) The router as set forth in claim 5,

wherein said plurality of data plane nodes are organized into a distributed network having a topology selected from the group consisting of ring topologies, star topologies, Clos topologies, toroid topologies, hypercube topologies and polyhedron topologies.

9. (Original) The router as set forth in claim 2,

wherein said partitionable control plane comprises a plurality of control plane nodes, each having at least one routing table and at least one control plane update buffer.

10. (Original) The router as set forth in claim 9,

wherein said plurality of control plane nodes are organized into a scalable cluster.

11. (Original) The router as set forth in claim 9,

wherein said control plane update agent module comprises a plurality of control plane update agents, each being associated with a control plane node.

12. (Original) The router as set forth in claim 9,

wherein said plurality of control plane nodes are organized into a distributed network having a topology selected from the group consisting of ring topologies, star topologies, Clos topologies, toroid topologies, hypercube topologies and polyhedron topologies.

13. (Currently Amended) A fault-tolerant routing element having a distributed scalable architecture, comprising:

means for detecting a fault in an active node disposed in said routing element, said active node for executing a router process;

means for effectuating a continuous switchover from said active node to a redundant node responsive to detecting said fault, said redundant node for continuation of said router process; and

means for partially updating routing table information and forwarding table information associated with said routing element responsive to said continuous switchover operation, including synchronizing said routing table information using a control plane update agent module, whereby forwarding tables are maintained, updated, and redundantly engineered independently of failures on routing tables.

wherein an update agent plane is separate from both a control plane and a data plane.

14. (Original) The fault-tolerant routing element as set forth in claim 13, wherein said active node comprises a control plane node.

15. (Original) The fault-tolerant routing element as set forth in claim 13, wherein said active node comprises a data plane node.

16. (Original) The fault-tolerant routing element as set forth in claim 13,

wherein said active node forms a portion of a topological cluster comprising a plurality of nodes.

17. (Currently Amended) A fault-tolerant routing method operable with a network element having a distributed scalable architecture, comprising:

detecting a fault in an active node disposed in said network element, said active node for executing a router process;

effectuating a continuous switchover from said active node to a redundant node responsive to detecting said fault, said redundant node for continuation of said router process; and

partially updating routing table information on a control plane and forwarding table information on a data plane associated and continuing to execute said router process based upon said updating step, including synchronizing said routing table information using a control plane update agent module, whereby forwarding tables are maintained, updated, and redundantly engineered independently of failures on routing tables.

and

wherein an update agent plane that performs said partial updating is separate from both said control plane and said data plane.

18. (Currently Amended) The fault-tolerant routing method as set forth in claim 17, further comprising:

~~a step of~~ determining ~~if~~ when said fault comprises a fatal fault involving said network element's control plane.

19. (Currently Amended) The fault-tolerant routing method as set forth in claim 17, further comprising:

~~a step of~~ determining ~~if~~ when said fault comprises a fatal fault involving said network element's data plane.

20. (Previously Presented) The fault-tolerant routing method as set forth in claim 17,

wherein said updating of said routing table information and said forwarding table information is configured based upon detecting said fault.

21. (Currently Amended) A router, comprising:

a plurality of control plane nodes that effectuate routing process functionality based on control updates from peer elements in a communications network, each control plane node including a routing information ~~database,~~ database with routing tables and a control plane update buffer ~~and a control plane update agent that synchronizes a plurality of routing tables~~; and

a plurality of data plane nodes that forward data based on said routing process functionality, each data plane node including a forwarding information ~~database,~~ database with forwarding tables and a data plane update buffer ~~and a data plane update agent~~, and

an update agent plane comprising a control plane update agent that synchronizes said routing tables on said control plane node and a data plane update agent that synchronizes said forwarding tables on said data plane node,

wherein said data plane update agents and control plane update agents partially update said forward information databases and said routing information databases in an asynchronous manner, and

whereby forwarding tables are maintained, updated, and redundantly engineered independently of failures on routing tables.

22. (Original) The router as set forth in claim 21,
wherein said plurality of control plane nodes and said plurality of data plane nodes are organized in a logically disjoint, distributed architecture.

23. (Original) The router as set forth in claim 22,

wherein said distributed architecture comprises a scalable cluster having a topology selected from the group consisting of ring topologies, star topologies, Clos topologies, toroid topologies, hypercube topologies and polyhedron topologies.

24. (Previously Presented) The router as set forth in claim 22, wherein said data plane update buffers and said control plane update buffers are updated by said data plane update agents and said control plane update agents in an asynchronous manner.

25. (Previously Presented) The router as set forth in claim 22, wherein said data plane nodes continue to forward data upon detecting a fault condition in at least one of said control plane nodes.

26. (Currently Amended) A distributed network, comprising:

a first network element that routes data; and

a second network element coupled to said first network element,

wherein at least one of said first network element and said second network element is comprised of a router with decoupled control and data planes and a separate update agent plane further comprising a control plane update module

~~operable to~~ that synchronizes ~~synchronize~~ a plurality of routing tables on said control plane,

whereby said forwarding tables are maintained, updated, and redundantly engineered independently of failures on said routing tables.

27. (Currently Amended) The distributed network as set forth in claim 26, wherein said router comprises:

a plurality of control plane nodes that effectuate routing process functionality based on control updates from peer elements in said distributed network, each control plane node including a routing information ~~database,~~ database with routing tables and a control plane update buffer ~~and a control plane update agent~~; ~~and~~

a plurality of data plane nodes that forward data based on said routing process functionality, each data plane node including a forwarding information ~~database,~~ database with forwarding tables and a data plane update buffer; ~~and a data plane update agent,~~ and

an update agent plane comprising a control plane update agent that synchronizes said routing tables on said control plane node and a data plane update agent that synchronizes said forwarding tables on said data plane node.

wherein said data plane update agents and control plane update agents update said forward information databases and said routing information databases in an asynchronous manner.

28. (Original) The distributed network as set forth in claim 27, wherein said plurality of control plane nodes and said plurality of data plane nodes are organized in a logically disjoint, distributed architecture.

29. (Original) The distributed network as set forth in claim 27, wherein said distributed architecture comprises a scalable cluster having a topology selected from the group consisting of ring topologies, star topologies, Clos topologies, toroid topologies, hypercube topologies and polyhedron topologies.

30. (Previously Presented) The distributed network as set forth in claim 27, wherein said data plane update buffers and said control plane update buffers are updated by said data plane update agents and said control plane update agents in an asynchronous manner.

31. (Previously Presented) The distributed network as set forth in claim 27, wherein said data plane nodes continue to forward data upon detecting a fault condition in at least one of said control plane node.